

IDAHO DEPARTMENT OF FISH & GAME

QUARTERLY COORDINATION REPORT
(Final Report)

Dingell-Johnson Projects



1 December 1977 - 28 February 1978

by

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QUARTERLY COORDINATION REPORT

(1 December 1977 - 28 February 1978)

IDAHO DEPARTMENT OF FISH AND GAME

This quarterly report is intended to satisfy the requirements under project F-67-C-3. The material that has been included was abstracted from the research biologists' annual performance reports and briefly summarizes the work undertaken and results for each of these projects during the year.

F-18-R-24 -- STATEWIDE FISHING HARVEST SURVEY

Job I. Estimates of the 1977 Harvest of Salmon and Steelhead

Preliminary estimates indicate that anglers caught approximately 900 Chinook salmon in the main stem of the Salmon River and 400 in the Middle Fork Salmon River during 1977.

Job II. Check Station Surveillance of Major Salmon Fisheries in Idaho

Between 21 May and 4 July 1977, Chinook salmon anglers in the upper Salmon River drainage caught an estimated 900 salmon in the main stem and an estimated 220 from the Middle Fork. Check stations operated to monitor these fisheries for possible overharvest disclosed fishing success only half that of prior years.

Post-season field work showed that most Chinook spawners remained in lower river areas until just prior to spawning time and were not in the areas normally fished by anglers. This prevented a potential overharvest on what appeared to be an extremely vulnerable resource.

F-49-R-16 -- SALMON AND STEELHEAD INVESTIGATIONS

Each year regional fishery biologists survey major Chinook salmon spawning areas in their respective regions to count the number of redds constructed in trend count areas and to obtain age and sex composition data. The data are made available for trend analysis, management and research use.

The redds counted in trend areas during 1977 were 25% less than the 5-year average for these areas.

Very few jacks were on the spawning grounds in 1977 which indicates poor survival of progeny from the 1974 brood year.

There appeared to be a late movement of fish onto the Bear Valley and Elk Creek spawning areas. We have always noted a short upstream movement of gravid fish just prior to the onset of spawning, but this late movement was more pronounced in 1977.

F-53-R-13 -- LAKE AND RESERVOIR INVESTIGATIONS

Job IV-a. Pend Oreille Lake Creel Census

In 1977, on Pend Oreille Lake, sport anglers fished an estimated 228,512 hours during 50,554 man-days to catch 247,343 fish between 13 January and 30 November. Sixty-seven percent of the anglers fished for kokanee which made up 96% of the estimated catch while 33% fished for trout including Dolly Varden which comprised 3% of the estimated catch. A small percentage of the anglers (negligible) fished for whitefish and spiny-rayed species which made up 1% of the total catch.

Anglers seeking kokanee fished an estimated 135,841 hours to catch 235,307 kokanee for an average catch rate of 1.6 fish/hour. There was a slight increase in kokanee catch in 1977 compared to 1976 with a decline in effort. The 1876 catch of 218,639 was the lowest recorded since 1951 when the census commenced.

The estimated kokanee yield in 1977 weighed 21,000 kg or .93 kg/ha (46,305 lb, .83 lb/acre). Large kokanee ranging to 53 cm (21 in) in length and weighing 1.6 kg (3.5 lb) appeared in the 1977 catch.

The percentage of age 3 (2+) kokanee increased in the catch during 1976 and 1977 compared to previous years indicating a weaker year-class abundance of the age 4 (3+) and 5 (4+) during 1976 and 1977.

Early-spawning kokanee contributed very little to angler success on the north end of the lake during 1977 (3.6%). In 1974 and 1975, 3.5 million early-spawning kokanee fry were released into the north end of the lake.

The net economic value of the total fishery in 1977 was estimated at 2.3 million dollars.

The estimated rainbow trout catch in Pend Oreille Lake during 1977 was 5,861. Of that total, 1,524 were trophy Kamloops (over 43.2 cm, 17 in). Anglers expended 70.8 hours for each trophy Kamloops caught.

To date the estimated return to the creel of hatchery released Kamloops has been .09% suggesting the program utilizing domestic Kamloops brood stock as an egg source for releases was marginal.

Job IV-c. Kokanee Spawning Trends in Pend Oreille Lake

Spawning escapement from both early and late-run kokanee was assessed in Pend Oreille Lake during the 1977-78 spawning season.

Counts from early-run kokanee peaked in Trestle Creek on 23 September 1977 with a count of 865. The kokanee run size from 1973 to 1977 in Trestle Creek has varied erratically, ranging in peak counts of nearly 15,000 in 1975 to less than 250 in 1974. Returns

to the tributaries in 1977 of 3.5 million early-.kokanee fry released in 1974 and 1975 were low, suggesting lake survival was marginal.

More late-spawning kokanee were observed in the tributaries and on the shorelines of Pend Oreille Lake during the 1977 spawning season than were observed in 1976. Granite Creek supported most of the observed tributary spawning while Bayview received most of the shoreline spawners. We passed 17,650 kokanee through the Sullivan Springs Creek weir in 1977. From those trapped kokanee we collected 2.4 million embryos that will be released as fry back into the system in mid summer of 1978.

Overall, by comparing maximum single counts (trends) of late-run kokanee taken during the spawning years 1972 through 1977, the 1972 and 1976 spawning years were similar, both being from one-third to one-half of the kokanee numbers counted from 1973, 1974, 1975, and 1977.

With the addition of mid-water trawl data in 1977 we estimated the potential kokanee escapement in the lake by assessing the abundance of mature fish in August. We estimated the lake to support 1.65 million mature kokanee in late summer which suggests that the trend estimates were low but that they reflected relative year-class strength.

Kokanee ranging to 48 cm (18.9 in) appeared in the spawning populations during 1977. The large size is a direct result of Mysis relicta populations in the lake.

Job IV-d: Limnological Studies in Pend Oreille Lake

The limnological program initiated on Pend Oreille Lake in 1974 was maintained during 1977. The trophic nature of Pend Oreille appears to be stable and no major changes were observed in nutrient content or primary production. The lake is a moderately productive, oligotrophic system.

Because of a very low runoff, transparency throughout the lake was much, greater than normal and the influence of flushing on the northern arm of the lake was much less. As a result, algal production was, greater on the north end of the lake than the south for the first time in 4 years and the relative difference in zooplankton biomass between ends of the lake was much less than normal. The lake also began warming early and the spring pulse in phytoplankton production occurred a month earlier than in any preceding season.

Mysid abundance did not increase from 1976 but the population was apparently distributed deeper in the water column than normal, perhaps in response to greater transparency and early warming, Daphnia abundance increased dramatically in 1977 and may represent, the establishment of a new species, D. galeata mendotae, which may better coexist with mysids, or merely a response to the vertical isolation of mysids and the unusual physical conditions in 1977. The latter case now seems likely.

Daphnia was the major prey item for kokanee composing 50% of the food consumed by the population throughout the summer, Mysids did not make a major contribution to the total diet, though a few fish fed extensively on them. Mysids probably do not compensate for the loss in food for most fish during years of poor Daphnia production.

Estimates of cropping indicates that kokanee used a very small portion of the available food supply. A comparison of fish abundance throughout the lake and the associated prey distribution, indicated that kokanee may not exert any significant cropping effect until their abundance approaches 30 kg/ha. Pend Oreille should support a larger kokanee population without seriously aggravating any problems of growth and survival of juvenile kokanee due to changing food availability.

Job IV-e. Kokanee Life History Studies in Pend Oreille Lake

During 1977 we used echosounding and mid-water trawling techniques to assess the status of the kokanee stock in Pend Oreille Lake. We measured peak abundance, assessed distribution and movement, monitored growth and estimated year-class strength of the kokanee stock in the lake.

Peak fish abundance stabilized in the lake in 1977. Acoustic estimates of 12.1 million were recorded in 1974 with 9.2 million in 1975, 7.6 million in 1976 and 7.7 million in 1977. Kokanee comprised 98.7% of those fish collected in the trawl suggesting changes in the acoustic estimates reflected changes in kokanee abundance.

Young-of-the-year kokanee were mostly recruited in the south end of the lake in 1977. They moved northward as the summer progressed. Age 1+ kokanee were the predominant age-class found on the north end of the lake.

Kokanee growth to the first annulus continued to decline in 1976 suggesting survival of the 1974 and 1975 kokanee year-classes was affected by declining cladoceran production that occurred in the lake in 1975 and 1976. Food production increased in 1977 with a subsequent increase in age 0+ kokanee growth during 1977. Kokanee biomass was measured in September at 17.2 kg/ha (15.33 lb/acre).

Estimates of year-class strength for the 1974, 1975 and 1976 kokanee year-classes suggest that fishing success will not improve through the 1980 fishing season. Stock abundance for those years indicates that the lake is understocked and chances for natural recovery appear marginal. Artificial enhancement of the kokanee stock appears to be the logical solution for restoring former levels of kokanee abundance to Pend Oreille Lake.

Job IV-f: Kamloops Life History in Pend Oreille Lake,

Lightning Creek appeared to be the most significant spawning tributary on the lake; supporting about the same number of spawning adults as was found in the entire Pack River drainage. We estimated the total lake spawning escapement in 1977 to approximate 200 to 300 Kamloops.

Snorkeling data from the tributary streams showed an initial downstream movement of Kamloops fry from the upper spawning gravels to lower nursery areas. The presence of 1-to 2-year-old fish in the lower tributaries, coupled with scale analysis data, indicated that a majority of the Kamloops juveniles reared in the tributaries before migrating to the lake.

Longevity and size are characteristics somewhat unique to the Kamloops found in Pend Oreille Lake. Maturity is generally not reached until the sixth year of life. Multiple repeat spawning is common allowing some individuals to reach an age of 9 years. Late maturity coupled with an abundant food supply of kokanee results in tremendous growth. The largest individuals of the population are normally those fish reaching maturity at age 7. A slower growth rate tends to delay maturity and the additional year of sustained feeding on kokanee produces a highly desirable size of fish. A weight of 9.6 kg (21.1 lb) and length of 852 mm (33.5 in) was found to be average for fish maturing at age 7. Kamloops maturing at age 6 averaged 6.3 kg (14.0 lb) in weight and 774 mm (30.5 in) in length.

Life history information is limited. However, scale interpretation indicates that juvenile Kamloops have migrated from nursery streams to the lake before reaching age 3. Growth is slow within the first 3 years of life, but quickly accelerates when kokanee become the dominant food item in the fourth year of life and at a length of approximately 432 mm (17 in).

The average calculated total lengths in millimeters (inches in parentheses) for ages 1 through 7 are: 80 (3.2), 143 (5.6), 289 (11.4), 434 (17.1), 625 (24.6), 779 (30.7), and 852 (33.5), respectively. Growth was relatively constant among the years sampled and among year classes. Clark Fork River fish were found to grow generally at the same rate as fish captured in the lake.

The average condition factor for age 5+ and age 6+ Kamloops was found to be 1.42. Condition factors varied but did not decline in the 4-year period of sampling.

Job XIV-b. Evaluation of Henrys Lake Management Program

From 9 March to 26 May 1977, we counted and marked 7,239 trout entering the Hatchery Creek spawning house (43.4% male). This was judged to be about 75% of the fish which attempted to enter the spawning house. The estimated mean total length and weight of the male cutthroat in the run was 463 mm (18.2 in) and 1,018 g (2.24 lb). Females averaged 456 mm (18.0 in) and 1,039 g (2.29 lb). Other than five fish which were judged to be first generation hybrids, all trout in the run showed predominantly cutthroat characteristics. Only 2% of the run were judged to have atypical cutthroat spotting patterns.

I estimated the total annual mortality rate for spawners in the 1976 spawning run from May 1976 to May 1977 at 73.2%. Only 1.4% of this mortality was due to the sport fishery. Three percent of the

1976 spawners were known to return to Hatchery Creek in 1977. These fish grew at an annual rate of about 37 mm (1.4 in) for males and 19 mm (0.8 in) for females. I estimated the population of cutthroat over 345 mm (13.6 in) in Henrys Lake near mid-June at 316,300 fish. This estimate assumes a 50% mortality rate for spawners prior to becoming available to the sport fishery.

Anglers fished an estimated 66,369 hours at Henrys Lake in 1977 to harvest 16,474 trout (29% brook trout). The mean season harvest rate was 0.25 trout per hour and the total catch rate 0.44 trout per hour. The exploitation rate on cutthroat appeared to be about 3% of the total population over 345 mm (13.6 in).

Nonresident anglers contributed 50% of the total angler effort at Henrys Lake. Boat anglers accounted for 95% of the angling effort and 98% of the harvest. Trolling was the most popular method of fishing and accounted for 52% of the effort while fly casters made up 32% of the season effort.

Cutthroat harvested in the 1977 sport fishery averaged 420 mm (16.5 in) and 908 g (2.00 lb) over the entire season. Brook trout averaged 362 mm (14.3 in) and 673 g (1.48 lb). Scale samples indicated that cutthroat trout reach an average length of 409 mm (16.1 in) by the end of their third year of life while brook trout average 356 mm (14.0 in) at that time.

The 1977 Hatchery Creek spawning run probably contained about 82% of the number of fish arriving in 1976, but showed a very significant increase in mean size. About 1.5% of the 1977 run were judged to be 5-year-olds compared to only 0.3% in 1976.

Fishing pressure in 1977 was within 3% of the 1976 estimate while the harvest was down 12%. Because of the increased percentage of brook trout in the harvest, the total number of brook trout harvested in 1977 actually increased over 1976. The total harvest rates for the 2 years were nearly identical, but the total catch rate in 1977 dropped by about 0.1 trout per hour. Low water made launching boats and fishing difficult during much of the latter half of the 1977 season.

The average size of cutthroat and brook trout harvested from Henrys Lake in 1977 was down slightly from 1976. However, the percentage of cutthroat over 500 mm (19.7 in) increased from 4 to 6% in 1977. Part of the decrease in mean size may be due to a larger percentage of the total season harvest occurring in May and June when mostly immature fish are harvested.

The growth rates of cutthroat and brook trout from Henrys Lake in 1977 appear to be equal to or greater than those calculated for fish caught in 1950-51.

Job XIV-c. Limnological Characteristics of Henrys Lake

Though the 1976-77 winter snowfall was well below normal in Island Park, trout survival in Henrys Lake was not adversely effected

during the summer and early winter of 1977. Heavy spring rains, a cooler than normal summer and a near capacity carry-over of water from 1976 combined to keep the trout habitat from deteriorating seriously.

The ice went out on 30 April at Henrys Lake in 1977. At no time did the dissolved oxygen content in areas of fish concentrations drop below 3-4 ppm prior to the spring thaw and no unusual winter mortality was observed. The oxygen tension remained at or above saturation at all depths during the open-water period and temperatures were well within the range of trout tolerance.

After the ice cover was complete in the fall, the oxygen tension of the water began to decrease slowly. By the end of December, the dissolved oxygen content 0.5 km (0.3 mi) SSW of the hatchery ranged from 4 ppm at the bottom, 4 m (13 ft), to 12 ppm immediately beneath the ice. Near the end of March, the oxygen content had decreased to a range of 0.4-3.0 ppm. However, the valves near the hatchery diffuser pipe, where fish were congregated, were in the range of 4-6 ppm.

Daphnia were the most abundant form of zooplankton sampled from the lake and peaks of abundance occurred in June and late August. The usually dense blooms of the blue-green algae Gloeotrichia and Aphanizomenon were much reduced this year.

Despite the drought, Henrys Lake entered the winter freeze-up with considerably more water storage than in several earlier years, notably 1961, 1966 and 1967. This fairly adequate storage and light phytoplankton bloom should help prevent undue winter mortality. Based on dissolved oxygen levels in areas of fish concentrations in late March, it appears that no unusually high winter mortality should occur prior to the spring thaw in 1978.

Job XVIII. Crane Falls Lake Fisheries Investigations

During 1977 a total of 4,917 anglers spent 17,776 hours fishing Crane Falls Lake to harvest 2,972 rainbow trout, 1,422 largemouth bass and 28 bullheads. An additional 1,270 rainbow and 378 largemouth were caught and released. Rainbow planted as catchables made up 85.7% of the harvest and those stocked as fingerlings made up 14.3%.

Anglers fishing through the ice (299) spent 1,298 hours and harvested 278 rainbow at a rate of 0.21 fish per hour. Anglers fishing through the ice fished 7.3% of the total hours spent on the lake during 1977 and harvested 9.4% of the total harvest.

Fly fishermen comprised 22.7% of the anglers fishing Crane Falls Lake, spent 24% of the hours, harvested 38.7% of the rainbow and 19.1% of the largemouth bass. Fly fishermen caught fish at a rate of 0.65 per hour.

Bait fishermen (other than ice fishermen) made up 58.2% of the anglers, fished 54.2% of the hours, harvested 45.4% of the rainbows and 7.7% of the largemouth. Bait fishermen caught fish at a rate of 0.16 per hour.

Lure fishermen made up 13% of the anglers, fished 14.5% of the hours, harvested 6.6% of the rainbow and 73.3% of the largemouth bass. Lure fishermen caught fish at a rate of 0.56 per hour.

During 1977, 19.6% of the anglers fishing Crane Falls Lake listed fishing as excellent, 46.9% good, 26.9% fair and 6.6% poor. Generally, fly fishermen were most satisfied with the fishery, followed in decreasing degree of satisfaction by lure fishermen, bait fishermen and ice fishermen,

Fly fishermen overwhelmingly approved of management of Crane Falls for quality fishing with the accompanying restrictions (95%), lure anglers slightly favored it (52.5%), ice fishermen were slightly in favor (52.5%) and less than half of the bait fishermen (42%) were in favor.

We found that with a six-fish limit and no supplemental releases during the summer that Crane Falls Lake could easily be fished out by mid-summer. During 1977 anglers had removed 58% of the fish by 22 April, 67% by 20 May, 90% by 17 June and 95% by 29 September.

Job XIX. Cove Arm Reservoir Fisheries Investigations

During 1977 (1 January-7 October) a total of 3,176 anglers spent 10,430 hours fishing Cove Arm Reservoir to harvest 2,821 rainbow, 10,288 crappie, 75 largemouth bass, 13 smallmouth bass, 449 perch, 259 bluegill and 426 bullhead. An additional 203 rainbow, 206 crappie, 3 largemouth bass, 4 perch and 4 bullheads were caught and released.

Approximately 80% of the harvest during 1977 was warm water fish and 20% trout.

Bait fishermen generated about three-fourths of the fishing effort during 1977 and harvested over two-thirds of the fish. Most fishing was from the bank.

F-66-R-3 -- RIVER AND STREAM INVESTIGATIONS

Job III-c Silver Creek Fisheries Investigations -- Survey of Angler Use and Harvest

In 1975 the Idaho Department of Fish and Game initiated an intensive fishery investigation on Silver Creek designed to aide the development of a management plan for the drainage. To assess the status of the fish stocks in Silver Creek we collected information on the relative abundance, density, distribution, species composition, movement, sizes and age and growth of fish. During 1977 we collected information characterizing the Silver Creek fishery, estimated total angler effort and harvest and assessed angler opinions regarding the fishery.

Silver Creek currently supports an abundant population of self-sustaining wild rainbow trout, particularly within the upper sections and tributaries. This population is comprised of predominantly 2- and 3-year-old trout; large (>400 mm) and old age (>IV+) trout are uncommon.

Since the early 1900's a variety of rainbow trout stocks have been introduced into Silver Creek forming a complex gene-pool. As a result, Silver Creek supports spring-spawning and fall-spawning races of rainbow trout. Although most wild rainbow trout sustained a home range, a portion of the population exhibited upstream and downstream migrations in the spring and fall related to spawning.

The primary tributaries; Stalker, Grove, Wilson and Loving creeks function as important spawning and rearing areas for wild rainbow trout.

Hatchery catchable rainbow trout planted in Silver Creek moved considerable distances from the planting site into sections of Silver Creek where no hatchery trout were planted.

Trout sampled in Silver Creek in 1976 and 1977 grew slower than trout sampled in 1952. However, a disproportionate number of trout sampled in 1952 consisted of old age fish. Growth of wild rainbow trout in Silver Creek in 1976 and 1977 was comparable to growth rates of trout in the South Fork Boise River.

Preliminary results indicate that the catch and release regulations currently in effect on Section 1 are increasing the abundance of large trout within that section.

Anglers expended an estimated 32,033 hours of effort and captured 32,112, game fish in Silver Creek and tributaries in 1977. Wild rainbow trout comprised a majority of the catch from all sections except 3 and 4 where large numbers of hatchery catchable rainbow trout were planted. The catch consisted of predominantly 2- and 3-year-old trout with few trout over 4-years-old.

A majority of the anglers who fished Silver Creek caught at least one game fish per trip (79% successful trips). The catch rate exceeded or approached one fish per hour in four stream sections. The catch rate for wild rainbow trout was largest in sections 1 and 2.

Although anglers were allowed to keep fish on sections 2 through 5 and Grove and Loving creeks, approximately 50% of the wild trout caught were subsequently released. Anglers released over 14,705 wild rainbow trout from a total catch of 20,683 wild rainbow in 1977. Fly fishermen released a majority (94%) of all wild rainbow released in 1977.

Fly fishermen comprised a majority of the anglers who fished Silver Creek in 1977. Anglers using flies were also the most successful fishermen on Silver Creek and they caught a disproportionate amount of the catch of wild rainbow trout for the effort expended.

Most anglers who fish Silver Creek considered the fishing good or fair, were satisfied with the species composition in the stream and preferred to catch wild rainbow trout. Anglers opposed plants of hatchery catchable rainbow trout in the upper sections of the stream and they supported the catch and release regulations in effect on section 1.

Job IV. Lochsa River Fisheries Investigations

To evaluate changes in angling pressure and harvest of game fish brought about by the newly imposed catch-and-release regulations above Boulder Creek, fisheries personnel conducted an intensive angler count-interview type creel census on the Lochsa River and the lower 12.9 km (8 mi.) of Crooked Fork Creek. Census techniques and stream sections were the same as those used in 1976.

From 28 May to 10 September 1977, anglers fished an estimated 8,785 hours below Boulder Creek to catch and keep an estimated 1,742 wild rainbow steelhead (27.5%), 4,021 hatchery catchable rainbow (63.4%), 210 cutthroat trout (3.3%), 22 Dolly Varden (0.3%) and 351 whitefish (5.5%). Anglers fished an additional 984 hours above Boulder Creek to catch and release an estimated 1,853 wild rainbow-steelhead, 541 cutthroat and 28 whitefish.

From 29 May to 10 September 1976, anglers fished an estimated 13,679 hours in the entire census area to catch and keep 11,170 wild rainbow-steelhead (73.0%), 2,557 hatchery catchable rainbow (16.7%), 654 cutthroat trout (4.3%), 195 Dolly Varden (1.3%) and 717 whitefish (4.7%).

In the new catch-and-release area above Boulder Creek, estimated angler effort decreased by 88.1% from 8,249 hours in 1976 to 984 hours in 1977. Actual harvest of wild rainbow-steelhead decreased 94.5% from 8,444 to 470 while harvest of cutthroat decreased 75.1% from 449 to 112.

Below Boulder Creek, which remained catch-and-keep both years, estimated angler effort increased by 61.7% from 5,430 hours in 1976 to 8,785 hours in 1977. Harvest of hatchery rainbow increased five-fold from 755 in 1976 to 4,021 in 1977.

Job VIII: Clearwater River Steelhead Investigations

Steelhead anglers fishing for summer run steelhead in the Clearwater River during the 1976 fall season did so under nonconsumptive regulations for the second time in as many years. There was no steelhead fishery permitted in the spring of 1977. Critically low passage across Snake River dams reduced Clearwater steelhead to an estimated 6,300 fish. Cooler than normal summer temperatures and near drought conditions during the fall provided excellent angling opportunities for catch-and-release steelhead fishermen. Increased river flows, due to Dworshak Dam discharges were limited to a 2-week period in late November and water temperatures remained above 5 C (41 F) until mid-December.

Steelhead anglers caught-and-released an estimated 1,852 summer run fish while spending 9,060 hours during the 3-month fishery (1 October-31 December) for an average catch rate of 4.9 hours per fish. The 1976 nonconsumptive fishery showed a three-fold increase in angling effort from the 1975 fishery, but still remained 81% lower than the 5-year average spent by steelhead anglers between 1969 and 1973.

The return of adult steelhead to Dworshak National Fish Hatchery during 1977 spawning operations reached 3,100 fish and we estimated an additional 400 fish were harvested by Nez Perce tribal fishermen. Based on the percentage of wild steelhead seen during the tagging program on the lower Clearwater, we estimated that 2,800 wild fish escaped to the Clearwater tributaries in 1977.

Workers on the lower Clearwater and Snake Rivers caught-and-released 193 hatchery steelhead marked with metal jaw tags and 149 (77%) were later recovered or recaptured. Three fish tagged-and-released in the lower Clearwater during the fall were subsequently recovered at Pahsimeroi Hatchery on the Salmon River. Six tagged adults were also observed crossing Lower Granite Dam during June 1977.

Two adult, unspawned hatchery spring chinook were equipped with miniature radio transmitters (AVM) and transported from Kooskia National Fish Hatchery to upper Lochsa tributaries and released in June 1977. Both fish remained in the upper river throughout the summer during an 8-week tracking period.

Underwater snorkel counts on the main Lochsa River transects showed a decrease in age-II and older juvenile steelhead from the previous 2 years. Divers also observed more hatchery rainbows in the lower Lochsa River transect areas. Selway River snorkel trend counts indicated that juvenile steelhead populations were at low level even though restrictive angling regulations had been in effect for 2 years.

F-67-C-3 -- FISHERY RESEARCH SUPERVISION

The Fishery Research Supervisor spent the quarter supervising the Dingell-Johnson projects with their many jobs.

The Fishery Management Supervisor spent the quarter coordinating the fishery management investigations project with its many jobs.

F-69-R-3 -- STREAM FLOW INVESTIGATIONS

Fish and wildlife resources and stream resource maintenance flow recommendations were determined for Grouse Creek, Lightning Creek, Little Wood River, Big Wood River, Malad River, Portneuf River, the Snake River from American Falls Reservoir upstream, Henrys Fork of the Snake River, Henrys Lake Outlet, Buffalo River, Warm River, Fall River, Teton River, Bitch Creek and the South Fork of the Snake River. The flow recommendations were determined by correlating fish and wildlife biological criteria with physical flow parameters predicted by the U. S. Bureau of Reclamation Water Surface Profile (Pseudo) Computer Program.

F-71-R-2 -- REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

Job I-a. Region 1 Mountain Lake Investigations

We reviewed lake survey cards, planting records, angler reports and recommendations by Department personnel to locate a lake suitable for introduction of golden trout for the purpose of establishing a permanent egg source. Forage Lake was selected and subsequently

golden trout were introduced.

Job I-b. Region 7 Lowland Lake Investigations

Coeur d'Alene Lake

High success rates were experienced by kokanee anglers in 1977. On Memorial Day (30 May) anglers caught an estimated 15,350 kokanee. Spawning escapement was excellent and 482,098 eggs were collected in lake tributaries.

Cutthroat trapping operations on Wolf Lodge Creek indicated a run size of about 3,000 fish in 1977. Approximately 183,000 cutthroat eggs were collected at traps on Wolf Lodge and Cedar Creeks for the Hayden Lake program.

McArthur Reservoir

After conducting public meetings to assess public preferences regarding management, we eradicated McArthur Reservoir. An effective kill was obtained and the lake was restocked with 132,702 young-of-the-year brook trout. A one time only release of 5,000 catchable-sized rainbow will be made in 1978.

Pend Oreille Lake

We took 2,323,174 kokanee eggs at Sullivan Springs in 1977. All resultant fry will be released in Sullivan Springs in the summer of 1978.

By trapping and marking, we estimated 100 Kamloops spawners used the Lightning Creek drainage in 1977.

Hayden Lake

Trapping of Hayden Creek, the major inlet, indicated annual spawning runs of about 800 adult trout mostly around 400 mm (15.7 in) in size presently occur in this drainage. A test release of 30,000 2-year-old westslope cutthroat to bolster the fishery and provide an egg source gave promising results with 118 mm (4.6 in) fish growing to 300 mm (11.8 in) between April and November of 1977. Management goals and brood stock programs for Hayden Lake were forwarded. These plans precede an egg source of westslope cutthroat for other waters.

Job I-c. Region 1 Stream Investigations

Snorkeling on the North Fork of the Coeur d'Alene River indicates a continued positive response of cutthroat populations to restrictive regulations imposed in 1975.

Limited sturgeon sampling in the Kootenai River revealed age and growth similar to that reported for Hells Canyon sturgeon.

Population sampling on the Moyie River and tributaries within British Columbia indicates little tributary spawning by rainbow. Most spawning seems to occur in the main stem.

Job I-d: Region I Technical Guidance

Region 1 management personnel provided private individuals, organizations and state and federal agencies with technical guidance and advice on projects associated with or having impacts on the fishery resource or aquatic habitat in Region 1. This guidance included written comments on 199 documents.

Job II-a. Region 2 Mountain Lake Investigations

Only two mountain lakes were investigated by Region 2 personnel during 1977. Of the three lakes scheduled for 1977, only Big Foot was visited. Fish Lake, on the North Fork Clearwater River, received its annual Investigation and creel census. The younger age class of cutthroat in Fish Lake, which have been on the decline, did show improvement during 1977. Hidden Lake and the Dennis lakes are top priority for investigation during 1978.

Job II-b. Region 2 Lowland Lake Investigations

Anglers at Winchester Lake averaged 0.87 fish per hour for the 1977 season. Rainbow that had been released as fingerlings made up 71% of the catch.

Residents made up 99% of the anglers at Waha Lake with a catch rate of 1.4 fish per hour. Coho were introduced in an attempt to better utilize the available food supply.

We caught three large-scale suckers in two gill nets prior to the fishing season in Manns Lake. Anglers caught trout at the rate of 1.06 fish per hour.

Rainbow trout held over well at Spring Valley Reservoir. We caught 63 rainbow that averaged 300 mm (11.8 in) in two gill nets. Residents made up 84% of the anglers interviewed at Spring Valley. These anglers averaged 0.67 fish per hour.

We treated Soldiers Meadow Reservoir with rotenone to eradicate all fish to break the tapeworm (protecephalus) cycle. Drought conditions had caused the reservoir to be almost empty. Angler success ranged from 0.9 to over 2.2 fish per hour.

Catch rates on Dworshak Reservoir averaged 0.56 fish per hour for the entire year. Rainbow trout was the species most caught followed by kokanee. Kokanee and smallmouth bass both had spawned successfully.

Job II-c. Region 2 Stream Investigations

Cub Creek has a falls approximately 3.2 km (2 mi) above its

confluence. Only rainbow are found above that point, while rainbow and cutthroat are numerous below there.

Palouse River has low water quality and few game fish in the lower part, while good to fair trout population are found above Laird Park.

Potlatch Creek has rearing potential for trout and steelhead in the upper section, but few trout are found in the lower river.

Job II-d. Region 2 Technical Guidance

Comments and/or inspections were made on 79 Department of Water Resource stream alteration permit applications. There was an increase in submissions of after-the-fact applications.

Evaluation and comments were made on various Forest Service Management Unit plans, farm pond permits, State Clearinghouse SAI Projects, road relocations and mining operations. Substantial time was spent on the South Fork Clearwater Highway 14 relocation.

Job II-e. Region 2 Salmon and Steelhead Investigations

There were 723,960 emigrating chinook fry enumerated at Indian Creek channel from the 1,613,383 eyed eggs planted in the fall of 1976. Only two chinook incubation channels were utilized during 1977 with a total eyed egg plant of 3,777,810. Channel tenders were hired to monitor flows at both channels.

All spawning ground count areas in the Clearwater River drainage had increased numbers of spring chinook redds.

The first catch-and-keep season for steelhead since 1974 was held during the fall of 1977 on the Clearwater River. It was a very successful fall season. An estimated 5,176 fish were caught in the Clearwater River at a rate of 15.9 hours per fish.

Surplus steelhead fry from Dworshak Hatchery were transported to Potlatch Creek, Lolo Creek and to tributaries of the South Fork of the Clearwater River.

Job III-a. Region 3 Mountain Lake Investigations

During the 1977 study period we inventoried 13 high mountain lakes in Region 3 and obtained creel data from seven others. Nine of the lakes surveyed lie at the head of the Secesh River, 10 in the Queens River drainage and 1 in the North Fork of the Boise River drainage.

We located three barren lakes in the Secesh drainage. One of those, Ruth Lake, had contained fish previously. All other lakes surveyed contained good populations of fish.

Job III-b. Region 3 Lowland Lake Investigations

During the 1977 study period we continued to evaluate coho emigration from Cascade Reservoir and the harvest trends for Horse-thief Reservoir. The 1977 drought resulted in many dry reservoirs. We did attempt to document those reservoirs and the resultant fish loss. At Mann Creek and C. Ben Ross Reservoirs we obtained a point estimate of the relative fish abundance and relative condition of those fish.

Job III-c. Region 3 Stream Investigations

Due to low water conditions we did not conduct any biological inventory of streams in Region 3. We did attempt to document these streams with low water conditions so we might evaluate the drought impact in 1978. A summary of our findings follows.

<u>Drainage</u>	<u>Conditions</u>
Owyhee County	Most streams and rivers throughout Owyhee County either went dry or ran intermittent through most of 1977.
Weiser River	The Weiser River was very low. It is doubtful if salmonid fish population remain in the lower sections.
Little Weiser	The Little Weiser River was intermittent.
Mann Creek	Mann Creek was very low or dry below Mann Creek Reservoir.
Payette River Drainage	Low water in the Payette River drainage but we should not have experienced any loss of fish.
Boise River Drainage	Low water in the Boise River drainage but with no loss of fish.

Most streams in the northern part of the region did not experience any problems. Water conditions in Owyhee County dictated that we close the fishing season to prevent harassment of wild trout populations.

Job III-d. Region 3 Technical Guidance

During the study period we reviewed and commented on 101 documents received from Idaho Department of Water Resources, Idaho Department of Health and Welfare, Idaho Department of Transportation, U. S. Environmental Protection Agency, U. S. Army Corps of Engineers and Ada Council of Governments. We also provided technical assistance to the Idaho Department of Health and Welfare on two city applications to lower water quality standards in Class A Streams of Idaho for sewage discharge.

Job III-e. Region 3 Salmon and Steelhead Investigations

Region 3 salmon and steelhead investigations data are incorporated in the separate statewide "Salmon and Steelhead Investigations" report.

Job IV-a. Region 4 Mountain Lake Investigations

Time limitations and work scheduling conflicts allowed only very little work to be done on this project. Water samples were collected and analyzed for total dissolved solids in Big Rainbow Lake, Middle Rainbow Lake, Big Lookout Lake and Fiddle Lake in the Trinity Mountain area. Total dissolved solids in the lakes was 189.0, 31.5, 14.0, and 16.8 mg/l respectively.

An intensive cooperative study involving the Department of Fish and Game and personnel from the Boise National Forest is planned for the summer of 1978.

Job IV-b. Region 4 Lowland Lake Investigations

Gill net sets made on Sublett Reservoir indicate excellent natural reproduction of rainbow trout, good populations of brown trout and low cutthroat trout populations. The average length of 181 rainbow obtained in the impoundment was 273 mm (10.8 in) with the largest 451 mm (17.8 in). Rainbow up to 2.3 kg (5 lb) were caught by anglers during the summer. Brown trout caught in gill net sets averaged 467 mm (18.4 in) and the largest brown caught measured 660 mm (26 in) and weighed approximately 3.6 kg (8 lb).

Reservoir water carryover in Region 4 was better than originally anticipated in some reservoirs but was critically low in others. Cool weather and heavy periodic precipitation in June and July allowed good carryover in Little Wood, Mormon and Roseworth Reservoirs. However, Magic, Little Camas and Fish Creek were drawn to minimum pool levels. Carey Lake was essentially dry and Thorn Creek got critically low. Portions of Carey Lake were dredged out to improve fisheries and waterfowl habitat after it went dry.

Little Camas Reservoir was chemically eradicated with Fintrol in late October to remove large numbers of suckers and shiners. Indications are a total kill was achieved.

The aeration unit on Thorn Creek Reservoir functioned fairly well throughout the winter of 1976-77. A number of mechanical and other problems occurred but significant portions of open water near the dam were maintained through most of the winter. No winterkill is known to have occurred and angling was excellent to fair from 1 April to late July. However, the water storage got critically low in late August and a total loss of trout was sustained.

Job IV-c. Region 4 Stream Investigations

As in 1976, sturgeon obtained from the Bliss-King Hill stretch of the Snake River showed consistently better growth rates than middle

Snake River sturgeon. Larger sample numbers are needed, however, to test for any significance. Two Snake River dams, Wylie and Dike, are being considered for construction in the near future in Region 4. If built, these dams would inundate the best remaining sturgeon habitat in the region.

Electrofishing studies indicate significant natural brown trout reproduction is occurring on the Little Wood River. In spite of this, a decline in the quality of the brown trout fishery on the stream indicates more protection of the spawners and supplemental fingerling plantings may be in order.

Drought conditions on Trail Creek necessitated a partial salvage and a relaxing of fishing regulations of the lower end of the stream in late April 1977. Sufficient flows, however, had been restored by the end of the month.

Water release was shut off at Magic Dam on 14 July when the reservoir reached minimum storage. Three days later an estimated 3,000 to 4,000 rainbow trout died in the section of the Big Wood between Magic Dam and the Richfield Canal diversion. The kill was only partial and good numbers of trout survived.

The Richfield Canal had to be salvaged in mid-July of 1977 shortly after the gates were shut at Magic Dam. Growth rates of rainbow and hatchery catchable rainbow trout continue to be relatively poor when compared to growth rates prior to 1970.

Job IV-d. Region 4 Technical Guidance

A total of 106 requests for comments by other agencies or organizations were processed in 1977 in Region 4. Comments were provided to Environmental Protection Agency, Bureau of Land Management, Army Corps of Engineers, U. S. Forest Service, University of Montana, State Clearinghouse and the State Departments of Water Resources, Transportation, Public Lands, and Health and Welfare.

Stream channel alteration permits processed, reviewed or inspected in the region totaled 49. Over 70% of these permits (35) were for the Big Wood River and tributaries.

Thirty National Pollution Discharge Elimination Standards were reviewed and commented on.

Numerous miscellaneous activities were commented on or participated in.

Considerable time was spent on the 5-year fisheries management plan for Region 4.

Job V-b. Region 5 Lowland Lake Investigations

Returns of tagged rainbow trout planted 3 May 1976 at Daniels Reservoir, Devils Creek Reservoir and Deep Creek Reservoir were 16.2%, 19.0% and 19.2% respectively. Returns of tagged rainbow trout planted

19 July 1976 at Devils Creek Reservoir, Deep Creek Reservoir and Daniels Reservoir were 11.0%, 11.4% and 11.6% respectively.

Returns of the Henrys Lake cutthroat variety planted in Blackfoot Reservoir in 1973 were 2.8%. Returns of the Webster Hatchery cutthroat variety (fine spotted) planted in the reservoir in 1975 were 2.0%.

Trout from Chesterfield Reservoir were salvaged in August because of its low water levels. The reservoir was treated after salvage to reduce its nongame fish population.

An unexpected fishery for trout in the 2.3 - 4.5 kg (5-10 lb) class developed in the Highway Pond near Pocatello during late March and April 1977. In May this pond virtually dried up resulting in the elimination of this fishery.

Job V-c. Region 5 Stream Investigations

We received tag returns from six cutthroat out of 111 tagged at First Creek, tributary to Deep Creek Reservoir, in May 1976. All tagged fish were caught from 29-31 May 1976, the opening weekend of the general fishing season.

Catch of cutthroat per angler from the upper Blackfoot River and tributaries varied from 1.56 fish in July 1975 to 3.63 fish in July 1972. Ninety-two percent of the fish taken in July were wild cutthroat trout and 8% eastern brook trout.

The peak numbers of spawning cutthroat from Blackfoot Reservoir reached Spring Creek, a major spawning tributary by 23 May. Peak spawning activity occurred earlier in 1977 than in the previous few years, probably because of low stream flow.

An estimated 200 cutthroat were stranded in the upper Allen Ranch Canal on 1 July 1977 when it was dewatered. An estimated 30 cutthroat were lost in the two lower Allen Ranch diversions at the same time. The three canals divert water from the Blackfoot River downstream from the Upper Narrows.

Electrofishing in the Blackfoot River below Blackfoot Dam indicated that high numbers of speckled dace and cottids were present near the dam with mountain whitefish found in high numbers near Blackfoot. Trout numbers immediately below Blackfoot Dam were low due to high mortality which occurred when the dam gates were shut in the fall.

On two electrofishing trips on the upper Portneuf River in February and March, we captured 173 wild rainbow, 35 cutthroat and 3 hatchery rainbow.

Job V-d. Region 5 Technical Guidance

During 1977 I reviewed and made comments on 36 stream channel

and lakeshore alteration projects. I also reviewed and made comments on two proposed U. S. Soil Conservation Service small watershed projects. In addition I developed comments on two proposed land purchases by the Department.

I collected fish from various locations affected by the Teton Dam flood. Samples from the fish will be tested for various pesticides.

I assisted research personnel in collecting water flow information from the Snake River downstream from American Falls. Flows in this river section were reduced to 200 cubic feet per second during November to facilitate storage in the American Falls Reservoir.

Job VI-a. Region 6 Mountain Lake Investigations

During the second ice fishery at Williams Lake we estimated that 3,850 hours were expended to catch 5,243 trout. We surveyed 6 mountain lakes and cataloged 446 others into a permanent file. Sunapee trout stocked in Sawtooth Lake in 1925 may be still present.

Job VI-b. Region 6 Lowland Lake Investigations

During 1977, an estimated 34,715 anglers fished 117,202 hours in Ririe Reservoir and harvested 61,256 rainbow trout, 9,275 brown trout, 9,056 cutthroat trout and 580 coho salmon weighing some 20,662 kg (45,551 lb). Eighteen percent of the fishing effort was through the ice, 58% from boats and 24% from the shoreline. Average catch rate was 0.68 fish (0.18 kg or 0.39 lb) per hour. The original rainbow trout plant in the new reservoir of 20,000 fingerlings in November 1975 provided 66% of the trout catch in 1976 and 23% of the January 1977 catch, reaching lengths up to 577 mm (23 in) by August 1977. Experimental gillnetting in May 1977 indicated that, of the original 1975 plants of rainbow, cutthroat, and brown trout, only cutthroat and browns remained in appreciable numbers. The plant of 45,000 fingerling brown trout provided 19% of the 1976 and 12% of the 1977 catch, reaching a maximum length of 386 mm (15.2 in). Cutthroat fry plants showed good survival but relatively poor returns to anglers.

Record numbers of catchable-size cutthroat trout were stocked in Palisades Reservoir from the Jackson National Fish Hatchery during 1977. Fishing was relatively poor in 1977 until late fall, when the catch rate averaged 0.62 trout per hour of angling.

At Island Park Reservoir fishing success was relatively high during 1977 as indicated by creel census interviews. This reservoir is scheduled for treatment to control nongame fish during October 1979 while drawn down for dam repairs.

Because of extreme drawdowns of Mackay Reservoir during recent years, heavy stocking has been necessary to provide a mediocre fishery.

Fast Springs impoundment at the Market Lake Wildlife Management Area was treated with fintrol to eradicate nongame species of fish in

February and was restocked with rainbow trout, perch and crappie.

Roberts Gravel Pit pond currently provides the major perch-crappie fishery in Region 6. Experimental gillnetting indicates undesirable species of fish were introduced during the Teton flood, but have not reached numbers where control measures should be undertaken.

Job VI-c. Region 6 Stream Investigations

Water and land-use practices along Birch Creek in Clark County have greatly reduced the stream's trout population during the past 23-year period. Efforts to restore the trout population by excluding livestock and placement of large rock and instream devices have been partially successful in test sections. In a reach improved in 1967 that had a 10-fold increase in numbers of trout, the fish population in 1977 was only 3.3 times as great as initially. A reach improved in 1976 supported 2.4 times as many trout in 1977. Creel census along 29 km (18 mi) of Willow Creek indicated average success and percentage of stream-reared trout were declining.

Overfishing in the tailwaters of Ririe Dam resulted in a reduction in average catch rates compared to 1976. Fishing pressure was very light in the remainder of the 8.4 km (5.2 mi) of stream below Ririe Dam due to poor access conditions. Boat access conditions need to be improved in order to disperse anglers over the entire 8.4 km (5.2 mi).

Drought-year water storage and diversion practices seriously affected fish habitat in the South Fork of the Snake River. Comparison of creel census information over the years did not indicate fish populations were subject to overharvest by anglers during low flow periods of early spring as catch rates remained within the normal range for that period of the year. The lower 32 km (20 mi) of the South Fork, downstream from major diversion points, became intermittent during the fall for the first time in many years. Tags of 10 to 11% of stream-reared cutthroat and brown trout were returned by anglers.

A low snow pack during 1977 apparently reduced mine drainage into Big Deer Creek as only 20% of fish in live box tests died compared to 100% mortality in 1976.

Hatchery-reared rainbow trout made up 31 and 46% of the harvest from streams in Big and Little Lost River drainages, respectively. Catch rates remained good in both streams, averaging 1.13 game fish per hour in the Big Lost and 1.41 in the Little Lost River streams.

Job VI-d. Region 6 Technical Guidance

Technical guidance and services were provided to the Bureau of Land Management, U. S. Forest Service, Corps of Engineers, Environmental Protection Agency, U. S. Fish and Wildlife Service, Bureau of Reclamation, Pacific Northwest Regional Commission, University of Idaho,

Idaho State University, State Clearinghouse, State Departments of Water Resources, Transportation, Health and Welfare, and Lands, private and public utilities, resorts, water boards and individuals,

Job VI-e. Salmon and Steelhead Investigations

Salmon spawning ground surveys were continued in established trend areas. For the upper Salmon River drainage, the counts were 82% of the average for the previous 5 years. Aerial surveys of steelhead redds on 13 May located only 39 redds. The proportion of steelhead in anglers' creels averaged 59% during the spring fishery and 67% in the fall fishery. We estimated the potential number of chinook redds in the upper Salmon River under saturation conditions to be about 60 redds/km.

F-72-R-1 -- FISH HATCHERY INVESTIGATIONS

Job I. Fish Disease Investigates

During the period of this study (1 July 1976 to 30 June 1977) I visited each state hatchery at least once to observe fish condition and general hatchery practices. In addition, I responded to 45 requests for diagnostic services to determine causes of excessive fish mortalities. Various diseases were diagnosed and appropriate treatment recommended.

Job II. Fish Hatchery Effluent Monitoring

In compliance with the provisions of the Federal Water Pollution Control Act, fish hatcheries are authorized to discharge, under the National Pollutant Discharge Elimination System (NPDES), a restricted amount of settleable and suspended solids to receiving waters. Monitoring of these and other parameters is required. Removal of settleable solids is needed to achieve final limits of permits. Reports of findings and data storage is also required by Federal law. During the period of 1 July 1976 to 30 June 1977 we monitored effluent discharges at the 11 state fish hatcheries that fall under these criteria.